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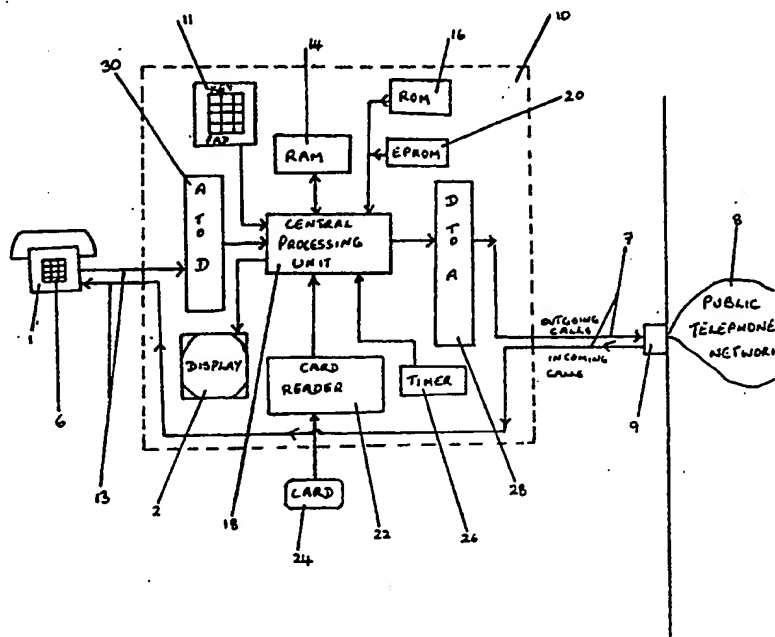
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(54) Security device for a telephone

(57) According to an embodiment of the invention the security device for a telephone will impose the following features on to a telephone:-

- (a) Bar all outgoing calls
- (b) Only a specific number of calls can be dialled from the telephone. The number having been set by the telephone owner
- (c) Specific types of numbers can be barred. The type having been chosen by the telephone owner
- (d) Specific numbers that can be dialled. The numbers having been chosen by the telephone owner
- (e) Any combination of (b), (c) and (d) above
- (f) The ability to store and display a log of numbers that were called, the duration of the calls and the time these calls were made. The log could only be displayed by the telephone owner.

As seen in figure 4, which is a block diagram of the security device for the telephone, it will have on it a card reader 22, which will decode data stored on the magnetic strip of the card 24, and each unit will have one or more cards that belong to it. Therefore only a card holder and one knowledgeable of the Personal Identification Number (PIN) code, usually the telephone owner will be able to gain access to the setting/resetting of the features (a) to (f) mentioned above.



GB 2 211 695 A

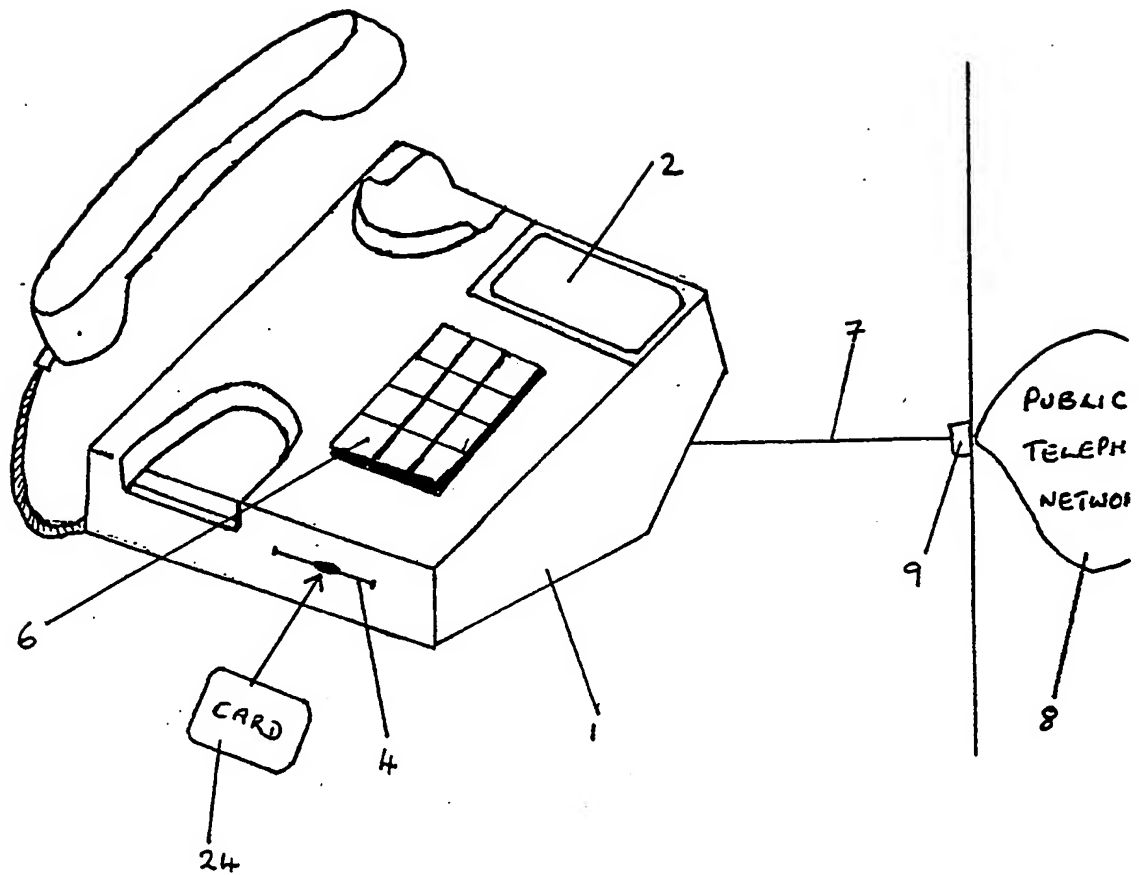


FIGURE 1

The security device for a telephone combined on to a telephone.



The security device for a telephone as an independent unit intercepting all outgoing calls from the telephone.

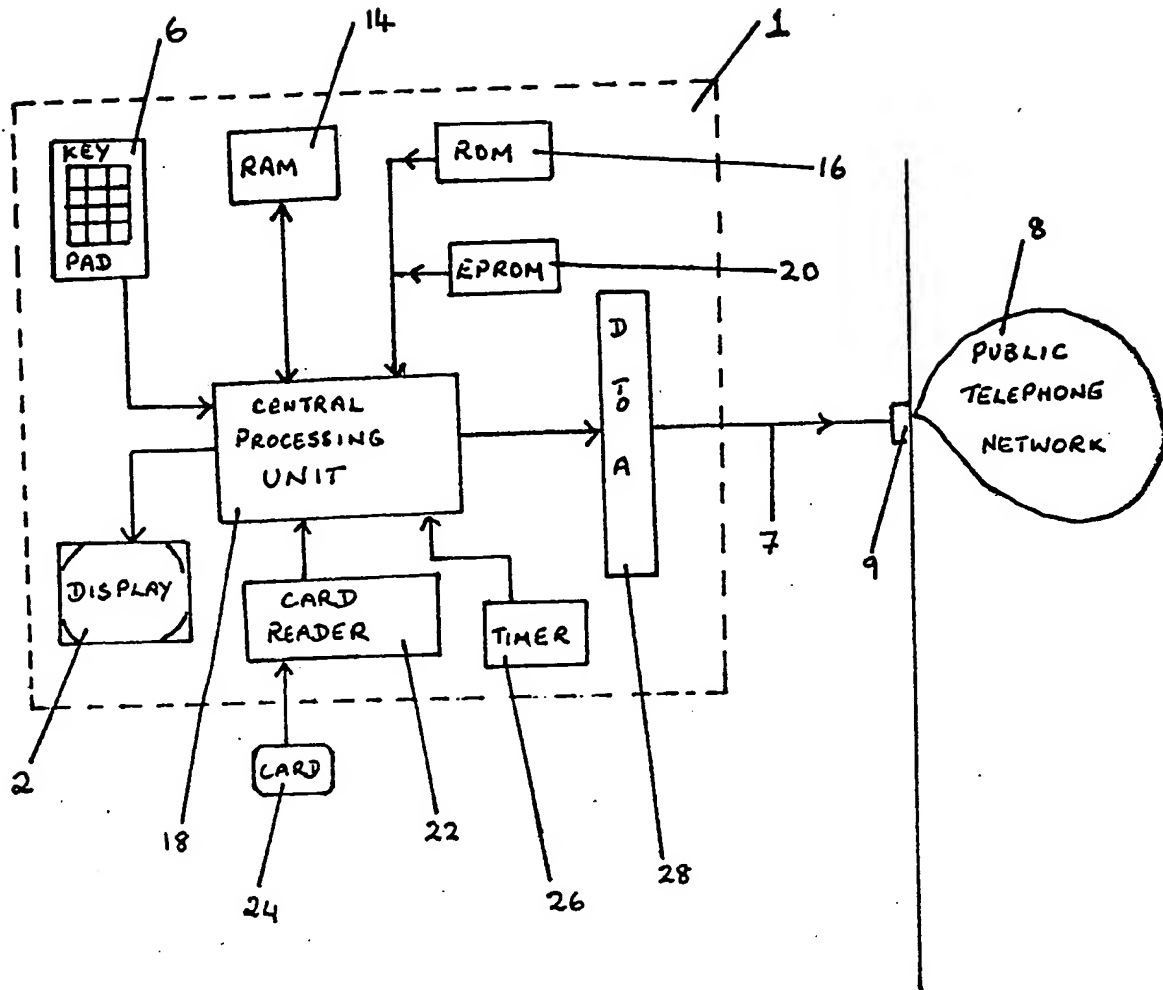


FIGURE 3

Block Diagram of extra internal circuitry required in a security device for a telephone which is combined on a telephone.

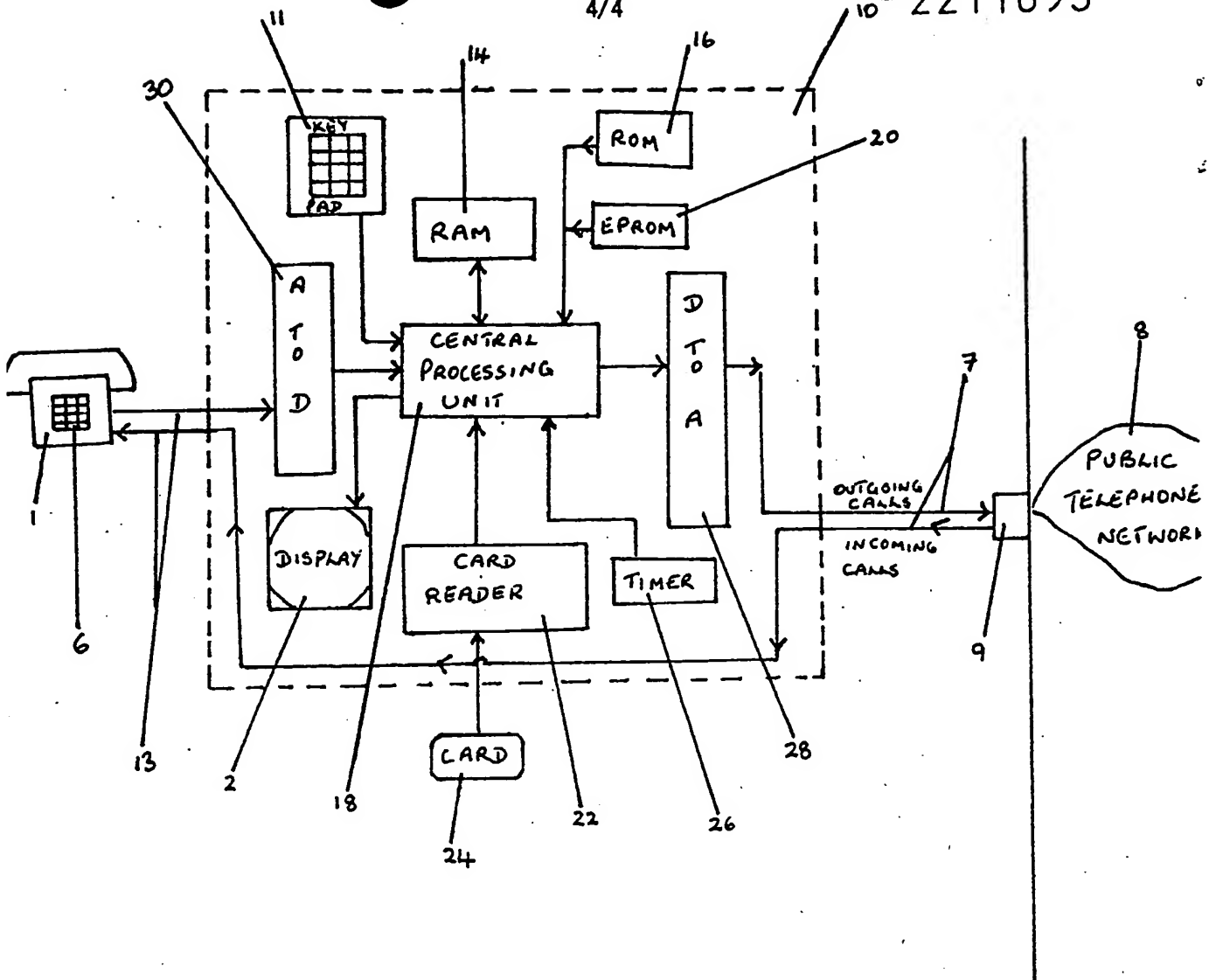


FIGURE 4

Block Diagram of the Security device for a telephone as an independent unit separate from the telephone.

This invention relates to a security device for a telephone. An embodiment of this invention relates to a unit which imposes features on a telephone. These features can be set or reset by only the privileged.

There are many situations and opportunities in which people can use a telephone without the owner's knowledge or consent. The major problems the owner encounters is that he/she has no way of knowing;

- the destination of the calls.
- the duration of the calls.
- the number of calls made.

In order to overcome these problems, a telephone owner must be provided with a telephone which has the following features:-

- (a) Bar all outgoing calls
- (b) Program in the number of calls that may be made. After that number, all further calls should be barred
- (c) Program in the types of numbers that should be barred, for example numbers beginning with "010" to prevent international calls being dialled from the U.K.
- (d) Program in specific numbers which can be dialled. All other calls should be barred
- (e) Any combination of (b), (c) and (d) above
- (f) A log which stores a list of numbers that were called, the duration of the calls and the time these calls were made.

Obviously only the owner must have control over the setting and resetting of these features.

Currently owners of telephones have various methods of gaining access to the setting/resetting of these features provided to them by the manufacturer of these types of telephones.

Some of these methods include, a lock and key, barring the keypad with a lockable shield, or control at a local exchange. However the problems arising from these methods are:-

1. The setting of various combinations of the features mentioned earlier cannot be achieved.

or,

2. In the case of a lock and key of some sort, if the key is lost, stolen or duplicated then the reason and effect of having these features would be immediately lost. Recovering to previous control would be a great inconvenience to the owner.

or,

3. In the case of control at a local exchange, the owner is not able to set these features at his/her own will, instead must rely on a controller, thus not giving the owner the flexibility that is required.

According to an embodiment of the present invention, the security device for a telephone, will impose all the features (a) to (f) mentioned previously on to a telephone. It will have on it a card reader, which will decode data stored on the magnetic strip of a plastic card and each unit will have one or more cards that belong to the unit. Therefore only a card holder and one knowledgeable of the personal Identification Number (PIN) code will be able to gain access to the setting and resetting of these features. This access method would solve the problems mentioned earlier, and if the card is lost, stolen or duplicated then all that is required is simply a re-issue of another card and a new PIN code.

A specific embodiment of the invention will now be described by way of examples with reference to the accompanying drawings in which:-

figure 1 shows the security device for a telephone combined on a telephone.

figure 2 shows the security device for a telephone as an independent unit intercepting all outgoing calls

figure 3 shows a block diagram of the internal circuitry that is required in a security device for a telephone combined on a telephone.

figure 4 shows a block diagram of the internal circuitry that is required in a security device for a telephone which is an independent unit.

The invention can take two forms. One is as seen in figure 1 and 3 where the security device for a telephone is combined into a telephone. In figure 2 and 4 the security device for a telephone is an independent unit which is fitted between an ordinary telephone and the public telephone network. In the second form of the invention, a number is dialled on the telephone, the security device receives this number, stores it temporarily to verify if it is allowed or not and then passes it on to the network to allow the call, or returns a number unobtainable tone to the telephone if the number is not allowed. In the first form of the invention the number is dialled, is stored temporarily, verified if it is allowed and is only "passed on" to the network if the number is allowed. Otherwise a user hears a number unobtainable tone and possibly sees an error message on the telephone display. Operational procedures are described in more detail later.

In both forms this invention's primary function will be to intercept all outgoing calls before a connection is allowed to be made. Therefore to maintain this type of security there must be a secure connection between the security device and the public telephone network to prevent users from bypassing these checks.

The advantages of the second approach (figure 2 and 4) are:-

- (a) All current telephone owners can impose these features on their telephones and thus control and monitor all calls.
- (b) It gives an owner the opportunity to set/reset these features discretely, if the telephone is in one room and the security device for a telephone in another or locked away in a cupboard. Thus controls are enforced which are totally invisible to the telephone user.

The advantage of the first approach (figure 1 and 3) is compactness. If an owner requires a telephone and a security device for a telephone without the need for discretion then he/she can purchase it as one unit.

In figure 1, a telephone 1, has on it a character display 2, keypad 6, and a slot 4 for inserting a plastic card 24. The telephone is connected to the public telephone network 8 by means of a standard telephone cable 7 and a secure connection 9.

In figure 2 a security device for a telephone 10 is connected to a telephone 1 by a cable 13. The security device for a telephone has on it, a character display 2, a keypad 11 which is separate from the keypad on the telephone 6, and a card slot 4. The security device for a telephone is then connected to the telephone network 8 by means of a standard telephone cable 7 and a secure connection 9 to prevent users removing the security device and thus bypassing the checks.

In figure 3 a central processing unit 18 is connected to a character display 2, a keypad 6, a card reader 22. A plastic card 24 with a magnetic strip on it is inserted into the slot 4 and is read by the card reader 22. The EPROM 20, contains the unique identification number of the security device which will usually be the telephone number of the telephone to which this unit is connected. This EPROM 20, could alternatively be a type of programmable switch. In either case it must only be changeable by the manufacturer or retailer and not by a telephone user, as it is the data stored in this device which identifies a plastic card to "belong" to this security device or not. The ROM 16, contains the programs to set the features, the program to log calls, the program which allows or prevents outgoing calls, and all messages to be displayed on the character display 2. The central processing unit 18, interprets and executes the instructions from the programs stored in the ROM 16. The RAM 14, is used to store variables such as:- setting the telephone to receive incoming calls only, the number of calls that are allowed to be made, the type of number that is to be barred, and/or the numbers that are allowed to go through, the dialled number stored temporarily to perform checks and log containing a list of numbers that were made, the time they were made and the duration of the calls. The digital-to-analog converter 28, converts the dialled number which is stored in the RAM to an analog signal once the call is allowed to be made and thus "passing it on" to the telephone network 8. The timer 26 is used to time the calls.

In figure 4 the functions of each input/output device, memory chip and processor are similar to figure 3, except in figure 3 the keypad 6 is used to dial the number of a call required and is used to gain access to the features, setting them and displaying the log. In figure 4 keypad 6 is used to dial a number only. Keypad 11 is used exclusively to gain access to the features, set them or displaying the log. There is also an analog-to-digital converter 30, which receives an analog signal of the number that was dialled from the telephone 1 and converts it to digital number in order to perform checks on it by the electronic circuitry and then passes it on to the public telephone network if it is allowed. Incoming calls to telephone 1 need not go through any checks in the security device for the telephone.

The procedure to set these features on the security device for a telephone is as follows:-

A card holder inserts a card 24 into the slot 4. The card reader 22 reads the magnetic strip on the card. The central processing unit 18 verifies that the unit identification number from the card 24 matches that which is stored in the EPROM 20. A message is then displayed on the character display 2 requesting

a card holder to enter his/her personal identification number. The personal identification number is keyed on keypad 6 or 11 (depending on which form of the invention is used). The central processing unit verifies that this matches that which is read from the magnetic strip of the card. Upon validation all existing features are cancelled and the card holder allowed to set any feature(s) he/she requires, or to examine the log stored in RAM 14.

Table 1 overleaf shows what is read/written to the RAM 14 should any of the features be selected from keypad 6 (or keypad 11 depending on the form of the invention.

FEATURE NUMBER	FEATURE DESCRIPTION	READ/ WRITE	Name	RAM DATA VARIABLES	
				Type	Value or Format
1.	Bar all outgoing calls	Write	"Outgoing Calls "	Logical Flag	False
2.	Allow NN Calls	Write	"No. of calls allowed"	Numerical	1 <= NN <= 99
3.	Bar certain types of	Write	"Barred No. Type"	List of 7 Numbers	NNNNNNN 0 <= N <= 9 (i.e. represents upto the first 7 digits of a No. that is not allowed)
4.	Allow certain Numbers	Write	"Allowable Numbers "	List of 10 16 digit Numbers	N <...16...> N ↑ 10 ↓ N <...16...> N (i.e. represents a list of upto 10 number allowed to be called)
5.	Display Log Numbers	Read	"Called No. Log"	List of 10 or more records	
			Each record comprises of fields:-		
			"No called"	16 digit No	N <...16...> N
			"Time call made "	Character	HH:MM:SS
			"Call Dura- tion"	Numerical	NNN (i.e. represents the call in minutes)

TABLE 1

When a telephone user wishes to dial a number on a telephone that has a security device for the telephone intercepting all outgoing calls, a number is allowed or prevented depending on which of the features 1 to 4 in table 1 have been set and on the dialled number.

Table 2 below shows the combination of features and what the dialled number must be equal to (or not equal to) to allow a call. All other combinations will bar the call. As soon as a number is dialled the security device for the telephone will perform this check.

Feature 1 Not set	Feature 2 Not set or No. of calls allowed > 0	Feature 3 Set	Feature 4 Set	Dialled Number	CALL Allowed/ Prevented
TRUE	TRUE	FALSE	FALSE	Equals any number	ALLOW
TRUE	TRUE	FALSE	TRUE	Equals one of the "allowable numbers"	ALLOW
TRUE	TRUE	TRUE	FALSE	Not equal to "Barred No. type"	ALLOW
TRUE	TRUE	TRUE	TRUE	Not equal to "Barred No. type" or is equal to one of the "Allowable Numbers"	ALLOW

TABLE 2

Once a call is allowed, the dialled number is logged and the time it was made. The call is timed from when the connection was made to when the receiver was replaced. As soon as the call is over the duration is logged. If feature 2 was set then the variable in RAM 14 "Number of calls allowed" must be decremented by 1. Thus the next call will be barred if this has reached zero.

CLAIMS:

1. A security device for a telephone having:
means for securing the security device against
5 unauthorised use,
means for selecting phone numbers or classes of phone
numbers to which conditions of use are to be applied
and for selecting the conditions to apply to those
numbers, and
10 means responsive to the selecting means for applying
the conditions to the selected numbers.
2. A device according to claim 1, wherein the
responsive means comprises storage means for storing
15 the selected numbers and the selected conditions
associated therewith, and means for comparing a number
chosen by a user of a telephone with the selected
numbers and for causing the condition associated
therewith to be applied thereto.
- 20 3. A device according to claim 2, wherein the
conditions applied to selected numbers include barring
a said selected number.

4. A device according to claim 2 or 3, wherein the conditions applied to selected numbers include allowing only selected numbers to be called.

5 5. A device according to claim 2, 3 or 4, wherein the conditions further include barring all outgoing calls.

10 6. A device according to claim 2, 3, 4 or 5 wherein the conditions further include applying a limit to the number of calls which can be made.

15 7. A device according to any preceding claim wherein the security means comprises a card reader for reading a security code from a card.

20 8. A device according to claim 7, wherein the security means further comprises means responsive to the said security code and a further code indicative of an authorised user to allow operation of the selecting means.

25 9. A device according to any preceding claim further comprising means for recording and displaying information relating to the use of the security device.

10. A security device substantially as hereinbefore described with reference to Figures 1, 2, 3 or 4 of the accompanying drawings.